REMARKS

Claims 5 - 18 are pending with claims 1 - 4 canceled and claims 5 - 18 added by this paper.

Information Disclosure Statement

Applicants acknowledge Examiner Vincent's time and courtesy during the 8 February 2005 teleconference with Applicants' representative James E. Ruland. The sole applicable item discussed during the telephone conference was the Examiner's striking of the patent abstracts from the PTO-1449 form submitted with the IDS filed 24 June 2002. These abstracts were struck because they are cumulative to, respectively, the Japanese patent documents (cite numbers B1 and B2) from that same form. Consequently, the Japanese abstracts were struck so as not to be printed on the face of the patent, although they were considered by the Examiner.

Claim Rejections Under 35 U.S.C §102(b)

Claims 1 - 4 stand rejected as allegedly being anticipated by JP 2000-302482 (JP). Applicants respectfully submit that these rejections are not applicable to the current pending claims.

First, JP teaches that etching is continued until latent changes disappear. Thus, a substrate having a smooth surface is obtained (see paragraph 18 of JP.) JP fails to teach etching so as to saturate the number of manifesting defects. See paragraph bridging pages 4 - 5 and FIG. 1 in present specification.

JP also fails to teach or suggest inspecting for surface defects with a stereomicroscope. Rather, JP teaches using an atomic force microscope (AFM). Such a microscope has at most a field of tens of micrometers. As such, it is impossible to scan and inspect an entire surface of, e.g., a 100 mm square glass substrate. The AFM is merely able to inspect only a part of the substrate for latent damages. Although it is possible to find defects having a submicron size present on a substrate surface using an AFM, it is practically impossible to detect only one submicron sized defect on the surface of, e.g., a 100 mm square substrate. Further, regardless of

its capabilities, an AFM is not a stereomicroscope and thus the claim elements are not met by the reference. See attached.

In marked contrast, a stereomicroscope has, generally, a microscopic field of from a few millimeters to over 10 millimeters. Consequently, such a microscope can scan an entire surface of a, e.g., 152 mm square substrate. Although a stereomicroscope has lower sensitivity as compared to an AFM for detecting submicron size latent damages on a surface, a stereomicroscope can scan the entire surface of the substrate and find defects even though the density of the defects on the substrate is low. The AFM scanning is only practically useful when there is an even distribution of defects on the entire surface.

Consequently, using an AFM as taught by JP can be used to inspect a substrate having a high density of uniform defects on the entire surface. However, such a microscope, as disclosed in JP, is not sufficient to confirm that the substrate is free of concave defects. Consequently, JP cannot anticipate the claimed invention.

In view of the above remarks, favorable reconsideration is courteously requested. If there are any remaining issues which can be expedited by a telephone conference, the Examiner is courteously invited to telephone counsel at the number indicated below.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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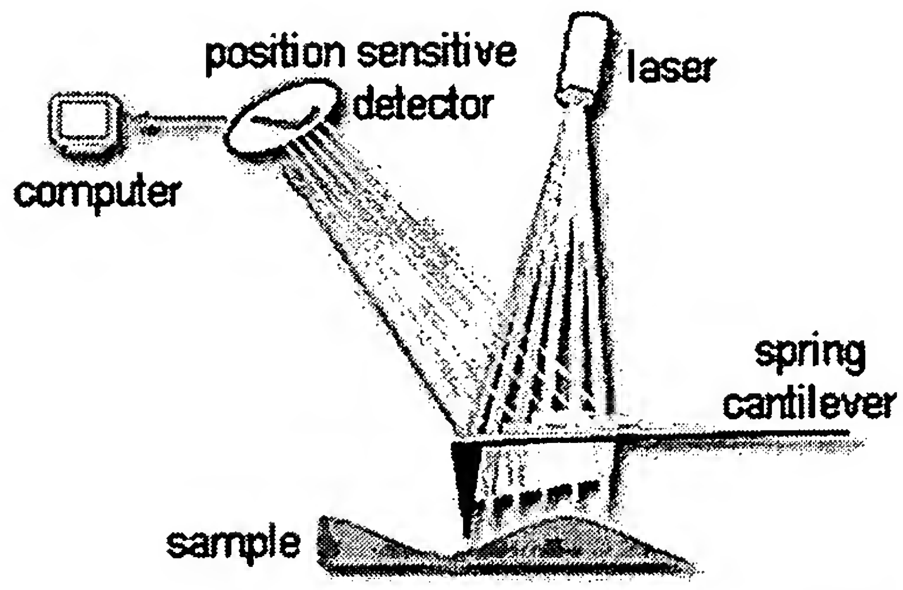
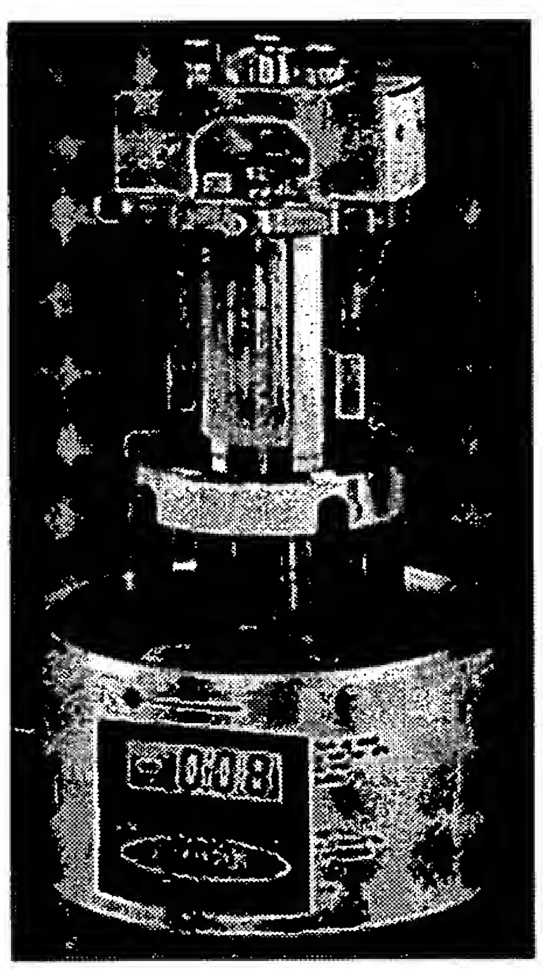
What is an Atomic Force Microscope?



The scanning tunneling microscope (STM) and atomic force microscope (AFM) provide pictures of atoms on or in surfaces. A system that uses variations of the principles used by an STM or AFM to image surfaces is often called a scanning probe microscope (SPM).

The AFM works by scanning a fine ceramic or semiconductor tip over a surface much the same way as a phonograph needle scans a record (for those of you that remember what a record player was!). The tip is positioned at the end of a cantilever beam shaped much like a diving board. As the tip is repelled by or attracted to the surface, the cantilever beam deflects. The magnitude of the deflection is captured by a laser that reflects at an oblique angle from the very end of the cantilever. A plot of the laser deflection versus tip position on the sample surface provides the resolution of the hills and valleys that constitute the topography of the surface. The AFM can work with the tip touching the sample (contact mode), or the tip can tap across the surface (tapping mode) much like the cane of a blind person.

Other measurements can be made using modifications of the SPM. These include variations in surface microfriction with a lateral force microscope (LFM), orientation of magnetic domains with a magnetic force microscope (MFM), and differences in elastic modulii on the micro-scale with a force modulation microscope (FMM). A very recent adaptation of the SPM has been developed to probe differences differences in chemical forces across a surface at the molecular scale. This technique has been called the chemical force microscope (CFM). The AFM and STM can also be used to do electrochemistry on the microscale.



A Digital Instruments Nanoscope IIIa Scanning Probe Microscope available in the Macromolecular Crystallization Laboratory.

CERTIFICATION OF MAILING

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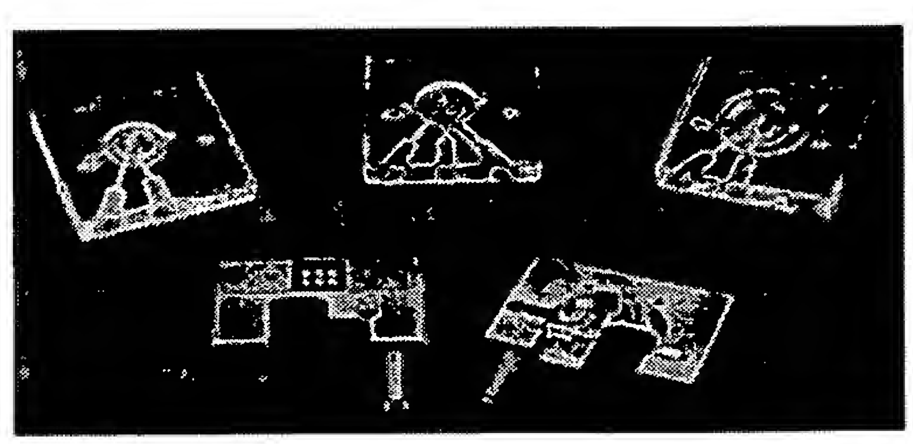


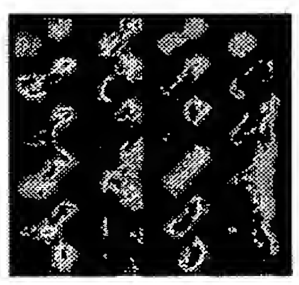
Fluid cell attachment for Nanoscope IIIa enabling crystal growth studies to be conducted in situ.

AFM is being used to solve processing and materials problems in a wide range of technologies affecting the

electronics, telecommunications, biological, chemical, automotive, aerospace, and energy industries. The materials being investigating include thin and thick film coatings, ceramics, composites, glasses, synthetic and biological membranes, metals, polymers, and semiconductors. The AFM is being applied to studies of phenomena such as abrasion, adhesion, cleaning, corrosion, etching, friction, lubrication, plating, and polishing. The publications related to the AFM are growing speedily since its birth.

Return to the homepages of:

AFM in Protein Crystallization



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